WE CLAIM:

1. A laser device comprising:

a target position;

an optical component separated a distance J from the target position;

a laser energy source separated a distance H from the optical component, distance H being greater than distance J; and

a laser source manipulation mechanism exhibiting a mechanical resolution of positioning the laser source, the mechanical resolution being less than a spatial resolution of laser energy at the target position as directed through the optical component.

2. The device of claim 1 wherein a vertical index and a lateral index that intersect at an origin are defined for the optical component, the manipulation mechanism auto aligning laser aim through the origin during laser source motion.

3. The device of claim 1 wherein the laser source manipulation mechanism comprises a mechanical index, the mechanical index comprising a pivot point for laser source lateral motion and a reference point for laser source vertical motion.

4. The device of claim 1 wherein the target position is located within an adverse environment comprising at least one of a high magnetic field, a vacuum system, a high pressure system, and a hazardous zone, the laser source and an electro-mechanical part of the manipulation mechanism being located outside the adverse environment.

5. The device of claim 1 wherein the target position is located within a vacuum chamber also within a high magnetic field that can hinder operation of electro-mechanical devices.

6. The device of claim 1 wherein the optical component comprises a lens.

7. The device of claim 1 wherein the optical component comprises multi-element optics.

8. The device of claim 1 wherein the laser source comprises a virtual source, the virtual source being separated the distance H from the optical component.

9. The device of claim 1 wherein the laser source can be placed in scanning motion by the manipulation mechanism.

10. The device of claim 1 wherein the laser source has a lateral rotational axis during lateral motion and a vertical rotational axis during vertical motion, the lateral axis and vertical axis intersecting at an axes origin from which the laser energy emanates independent of laser source position.

11. The device of claim 1 wherein the mechanical resolution comprises both lateral and vertical mechanical resolution and the spatial resolution comprises both lateral and vertical spatial resolution.

12. The device of claim 1 wherein the spatial resolution approximately equals the mechanical resolution multiplied by a ratio of distance J to distance H and wherein at least one of distance H and distance J can be altered, modifying the spatial resolution.

13. The device of claim 1 wherein the manipulation mechanism comprises a Peaucellier linkage.

14. The device of claim 1 further comprising at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

15. A laser device comprising:

a target position;

a lens separated a distance J from the target position;

a laser energy virtual source separated a distance H from the lens, distance H being greater than distance J;

a virtual source manipulation mechanism exhibiting a mechanical resolution of positioning the virtual source, the mechanical resolution being less than a spatial resolution of laser energy at the target position as directed through the lens; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

16. The device of claim 15 wherein the virtual source has a lateral rotational axis during lateral motion and a vertical rotational axis during vertical motion, the lateral axis and vertical axis intersecting at an axes origin from which the laser energy emanates independent of virtual source position.

17. The device of claim 15 wherein the mechanical resolution comprises both lateral and vertical mechanical resolution and the spatial resolution comprises both lateral and vertical spatial resolution.

18. The device of claim 15 wherein the spatial resolution approximately equals the mechanical resolution multiplied by a ratio of distance J to distance H and wherein at least one of distance H and distance J can be altered, modifying the spatial resolution.

19. A laser device comprising:

an optical component having a vertical index and a lateral index that intersect at an origin;

a laser energy source aimed at the origin; and

a laser source manipulation mechanism linking vertical and lateral laser source motion to the respective vertical and lateral indices and auto aligning laser aim through the origin during laser source motion.

20. The device of claim 19 further comprising a target position separated a distance J from the optical component, wherein the laser source is separated a distance H from the optical component greater than distance J and wherein the manipulation mechanism exhibits a mechanical resolution of displacing the laser source less than a spatial resolution of displacing laser energy at the target position.

21. The device of claim 19 wherein at least one of the lateral index and vertical index comprises a line.

22. The device of claim 19 wherein the optical component comprises a lens.

23. The device of claim 19 wherein the optical component comprises multi-element optics.

24. The device of claim 19 wherein the laser source comprises a virtual source.

25. The device of claim 19 wherein the laser source can be placed in scanning motion by the manipulation mechanism.

26. The device of claim 19 wherein the laser source has a lateral rotational axis during lateral motion and a vertical rotational axis during vertical motion, the lateral axis and vertical axis intersecting at an axes origin from which the laser energy emanates independent of laser source position.

27. The device of claim 19 wherein the lateral laser source motion is physically linked to the lateral index.

28. The device of claim 19 wherein the vertical laser source motion is physically linked to the vertical index.

29. The device of claim 19 wherein the manipulation mechanism comprises an approximate center of lateral pivot for laser source motion approximately coincident with the lateral index and an approximate center of vertical pivot for laser source motion approximately coincident with the vertical index.

the lateral index and an approximate center of vertical pivot for laser source motion approximately coincident with the vertical index.

30. The device of claim 19 wherein the manipulation mechanism comprises a mechanical gimbal.

31. The device of claim 19 wherein the manipulation mechanism comprises a virtual gimbal.

32. The device of claim 19 further comprising at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

33. A laser device comprising:

a lens having a vertical index and a lateral index that intersect at an origin;

a laser energy virtual source aimed at the origin;

a virtual source manipulation mechanism linking vertical and lateral virtual source motion to the respective vertical and lateral indices and auto aligning laser aim through the origin during virtual source motion; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

34. The device of claim 33 wherein the virtual source has a lateral rotational axis during lateral motion and a vertical rotational axis during vertical motion, the lateral axis and vertical axis intersecting at an axes origin from which the laser energy emanates independent of laser source position.

35. The device of claim 33 wherein the lateral and vertical virtual source motion is physically linked to the respective lateral and vertical indices.

36. The device of claim 33 wherein the manipulation mechanism comprises an approximate center of lateral pivot for virtual source motion approximately coincident with the lateral index and an approximate center of vertical pivot for virtual source motion approximately coincident with the vertical index.

37. A laser device comprising:

a target position;

an optical component separated a distance J from the target position;

a laser energy source separated a distance H from the optical component; and

a laser source manipulation mechanism comprising a mechanical index:

the mechanical index comprising a pivot point for laser source lateral motion and a reference point for laser source vertical motion; and

lateral displacement of the laser source producing a related, predictable lateral displacement of laser energy at the target position as directed through the optical component.

38. The device of claim 37 wherein distance H is greater than distance J and the manipulation mechanism exhibits a mechanical resolution of displacing the laser source less than a spatial resolution of displacing laser energy at the target position.

39. The device of claim 37 wherein a lateral index is defined for the optical component, the manipulation mechanism auto aligning laser aim through the lateral index during laser source motion.

40. The device of claim 37 wherein the target position is located within an adverse environment comprising at least one of a high magnetic field, a vacuum system, a high pressure system, and a hazardous zone, the laser source and an electro-mechanical part of the manipulation mechanism being located outside the adverse environment.

41. The device of claim 37 wherein the target position is located within a vacuum chamber also within a high magnetic field that can hinder operation of electro-mechanical devices.

42. The device of claim 37 wherein the optical component comprises a lens and the mechanical index tracks a curved surface of the lens during vertical motion.

43. The device of claim 37 wherein the laser source comprises a virtual source, the virtual source being separated the distance H from the optical component.

44. The device of claim 37 wherein vertical displacement of the mechanical index produces a related, predictable vertical displacement of laser energy at the target position as directed through the optical component.

45. The device of claim 37 wherein vertical displacement of the mechanical index controls a vertical angle of laser energy departure from the laser source at least in part with a pendulum linked to the laser source.

46. The device of claim 37 wherein the laser source can be placed in scanning motion by the manipulation mechanism.

47. The device of claim 37 wherein the laser source has a lateral rotational axis during lateral motion, the laser energy emanating from along the lateral axis independent of laser source vertical position.

48. The device of claim 37 wherein laser energy lateral displacement at the target position approximately equals laser source lateral displacement multiplied by the ratio of distance J to distance H.

49. The device of claim 37 wherein the manipulation mechanism comprises a Peaucellier linkage.

50. The device of claim 37 further comprising at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

51. A laser device comprising:

a target position;

a lens separated a distance J from the target position;

a laser energy virtual source separated a distance H from the optical component;

a virtual source manipulation mechanism comprising a mechanical index:

the mechanical index comprising a pivot point for virtual source lateral motion and a reference point for virtual source vertical motion; and

lateral displacement of the virtual source producing a related, predictable lateral displacement of laser energy at the target position as directed through the lens; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

52. The device of claim 51 wherein vertical displacement of the mechanical index controls a vertical angle of laser energy departure from the virtual source at least in part with a pendulum linked to the virtual source.

53. The device of claim 51 wherein the virtual source has a lateral rotational axis during lateral motion, the laser energy emanating from along the lateral axis independent of virtual source vertical position.

54. The device of claim 51 wherein the manipulation mechanism comprises a Peaucellier linkage.

55. A laser device comprising:

an optical component;

a laser energy source separated from the optical component; and

a laser source manipulation mechanism comprising a Peaucellier linkage, the manipulation mechanism aiming the laser source through the optical component.

56. The device of claim 55 further comprising a pendulum linked to the laser source.

57. The device of claim 55 wherein the manipulation mechanism auto aligns laser aim through a lateral index within the optical component during laser source lateral motion.

58. The device of claim 55 wherein the Peaucellier linkage comprises a mechanical index, the mechanical index comprising a pivot point for laser source lateral motion and a reference point for laser source vertical motion.

59. The device of claim 55 further comprising a target position located within an adverse environment comprising at least one of a high magnetic field, a vacuum system, a high pressure system, and a hazardous zone, the laser source and an electro-mechanical part of the manipulation mechanism being located outside the adverse environment.

60. The device of claim 55 further comprising at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

61. A laser device comprising:

a lens;

a laser energy virtual source separated from the lens; and

a virtual source manipulation mechanism comprising a Peaucellier linkage, the manipulation mechanism aiming the laser source through the lens; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

62. The device of claim 61 further comprising a pendulum linked to the virtual source.

63. The device of claim 61 wherein the manipulation mechanism auto aligns laser aim through a lateral index within the lens during virtual source lateral motion.

64. A laser device comprising:

a target position located within an adverse environment;

an optical component separated from the target position;

a laser energy source located outside the adverse environment; and

a laser source manipulation mechanism comprising electro-mechanical parts all of which are located outside the adverse environment, the manipulation mechanism aiming the laser source through the optical component at the target position.

65. The device of claim 64 wherein the laser source is separated from the optical component by at least about 1.3 meters (4 feet).

66. The device of claim 64 wherein the adverse environment comprises at least one of a high magnetic field, a vacuum system, a high pressure system, and a hazardous zone.

67. The device of claim 64 wherein the target position is located within a vacuum chamber also within a high magnetic field that can hinder operation of the electro-mechanical part.

68. The device of claim 64 wherein a vertical index and a lateral index that intersect at an origin are defined for the optical component, the manipulation mechanism auto aligning laser aim through the origin during laser source motion.

69. The device of claim 64 wherein the manipulation mechanism comprises a Peaucellier linkage.

70. The device of claim 64 further comprising at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

71. A laser device comprising:

a target position located within an adverse environment;

a lens separated from the target position;

a laser energy virtual source located outside the adverse environment;

a laser source manipulation mechanism comprising electro-mechanical parts all of which are located outside the adverse environment, the manipulation mechanism aiming the laser source through the optical component at the target position; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

72. The device of claim 71 wherein the adverse environment comprises at least one of a high magnetic field, a vacuum system, a high pressure system, and a hazardous zone.

73. The device of claim 71 wherein the target position is located within a vacuum chamber also within a high magnetic field that can hinder operation of the electro-mechanical part.

74. A laser device comprising:

a target position;

an optical component separated a distance J from the target position, the optical component having a vertical index and a lateral index that intersect at an origin;

a laser energy source aimed at the origin and separated a distance H from the optical component, distance H being greater than distance J;

a laser source manipulation mechanism linking vertical and lateral laser source motion to the respective vertical and lateral indices and auto aligning laser aim through the origin during laser source motion;

vertical and lateral displacement of the laser source producing a related, predictable vertical and lateral displacement of laser energy at the target position as directed through the optical component; and

vertical and lateral displacement of the laser source exhibiting a mechanical resolution less than a spatial resolution of the respective vertical and lateral displacement of laser energy at the target position.

75. The device of claim 74 wherein the target position is located within an adverse environment comprising at least one of a high magnetic field, a vacuum system, a high pressure system, and a hazardous zone, the laser source and an electro-mechanical part of the manipulation mechanism being located outside the adverse environment.

76. The device of claim 74 wherein the manipulation mechanism comprises an approximate center of lateral pivot for laser source motion approximately coincident with the lateral index and an approximate center of vertical pivot for laser source motion approximately coincident with the vertical index.

77. The device of claim 74 wherein the lateral and vertical spatial resolutions approximately equal the respective lateral and vertical mechanical resolutions multiplied by a ratio of distance J to distance H and wherein at least one of distance H and distance J can be altered, modifying the lateral and vertical spatial resolutions.

78. The device of claim 74 wherein laser energy lateral and vertical displacement at the target position approximately equals laser source lateral and vertical displacement multiplied by the ratio of distance J to distance H.

79. The device of claim 74 further comprising at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

80. A laser device comprising:

a target position;

a lens separated a distance J from the target position, the lens having a vertical index and a lateral index that intersect at an origin;

a virtual laser energy source aimed at the origin and separated a distance H from the optical component, distance H being greater than distance J;

a virtual source manipulation mechanism linking vertical and lateral virtual source motion to the respective vertical and lateral indices and auto aligning laser aim through the origin during virtual source motion;

vertical and lateral displacement of the virtual source rotating about the respective vertical and lateral indices producing a related, predictable vertical and lateral displacement of laser energy at the target position as directed through the optical component;

vertical and lateral displacement of the virtual source exhibiting a mechanical resolution less than a spatial resolution of the respective vertical and lateral displacement of laser energy at the target position; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

81. A laser device comprising:

a target position;

an optical component separated from the target position;

a laser energy source separated from the optical component and having a lateral rotational axis during lateral motion and a vertical rotational axis during

vertical motion, the lateral axis and vertical axis intersecting at an axes origin from which the laser energy emanates independent of laser source position; and

a laser source manipulation mechanism laterally and vertically positioning the laser source and aiming the laser energy through the optical component.

82. The device of claim 81 wherein a vertical index and a lateral index that intersect at an origin are defined for the optical component, the manipulation mechanism auto aligning laser aim through the origin during laser source motion.

83. The device of claim 81 wherein the laser source comprises a virtual source.

84. The device of claim 82 wherein the lateral laser source motion is physically linked to the lateral index.

85. The device of claim 82 wherein the vertical laser source motion is physically linked to the vertical index.

86. The device of claim 82 wherein the manipulation mechanism comprises an approximate center of lateral pivot for laser source motion approximately coincident with the lateral index and an approximate center of vertical pivot for laser source motion approximately coincident with the vertical index.

87. The device of claim 81 wherein the laser source vertical axis is formed by a swing nested within a first box and rotating therein, the laser energy emanating from a prism rotating with and mounted on the swing.

88. The device of claim 81 wherein the laser source lateral axis is formed by a first box nested within a second box and rotating therein, the laser energy emanating from a prism rotating with the first box.

89. The device of claim 81 wherein laser source vertical motion is accomplished by a second box nested within a third box, the second box moving vertically and approximately linearly within the third box.

90. The device of claim 81 wherein laser source lateral motion occurs approximately linearly.

91. The device of claim 81 wherein the laser source is wavelength independent.

92. A laser device comprising:

a target position;

a lens separated from the target position;

a virtual laser energy source separated from the lens and having a lateral rotational axis during lateral motion and a vertical rotational axis during vertical motion, the lateral axis and vertical axis intersecting at an axes origin from which the laser energy emanates independent of laser source position; and

a virtual source manipulation mechanism laterally and vertically positioning the virtual source and aiming the laser energy through the lens; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.

93. A laser device comprising:

a target position within a high magnetic field;

an optical component separated from the target position;

a laser energy source separated from the optical component;

a laser source manipulation mechanism laterally and vertically positioning the laser source and aiming the laser energy through the optical component to the target position; and

a damping device operating under Lenz' Law to reduce vibration of the target position.

94. The device of claim 93 wherein the damping device comprises a non-ferromagnetic material exhibiting high electrical conductivity.

95. The device of claim 93 wherein the damping device comprises at least one of aluminum and copper.

96. The device of claim 93 wherein the laser device is comprised by a laser desorption spectrometer and the damping device comprises a probe bar including the target position and cell supports of at least one desorbed energy detection cell, the probe bar and cell supports being subject to Lenz' Law.

97. The device of claim 93 wherein the high magnetic field is greater than 50 Gauss.

98. The device of claim 93 wherein the target position is separated a distance J from the optical component, wherein the laser source is separated a distance H from the optical component greater than distance J, and wherein the manipulation mechanism exhibits a mechanical resolution of displacing the laser source less than a spatial resolution of displacing laser energy at the target position.

99. The device of claim 93 wherein a vertical index and a lateral index that intersect at an origin are defined for the optical component, the manipulation mechanism auto aligning laser aim through the origin during laser source motion.

100. The device of claim 93 wherein the laser source manipulation mechanism comprises a mechanical index, the mechanical index comprising a pivot point for laser source lateral motion and a reference point for laser source vertical motion.

101. The device of claim 93 wherein the manipulation mechanism comprises an electro-mechanical part located outside the high magnetic field and the laser source is located outside the high magnetic field.

102. The device of claim 93 wherein the target position is located within a vacuum chamber.

103. The device of claim 93 wherein the optical component comprises a lens.

104. The device of claim 93 wherein the laser source comprises a virtual source.

105. The device of claim 93 wherein the laser source has a lateral rotational axis during lateral motion and a vertical rotational axis during vertical motion, the lateral axis and vertical axis intersecting at an axes origin from which the laser energy emanates independent of laser source position.

106. A laser device comprising:

a target position within a high magnetic field;

a lens separated from the target position;

a virtual laser energy source separated from the optical component;

a virtual source manipulation mechanism laterally and vertically positioning the virtual source and aiming the laser energy through the optical component to the target position;

a damping device operating under Lenz' Law to reduce vibration of the target position; and

at least one desorbed energy detection cell, the laser device being comprised by a laser desorption spectrometer.